

REMARKS

Claims 1 and 3-23 are currently pending in the subject application and are presently under consideration.

Favorable reconsideration of the subject patent application is respectfully requested in view of the comments herein.

I. Rejection of Claims 1, 3-8, 10, and 17-23 Under 35 U.S.C. §103(a)

Claims 1, 3-8, 10, and 17-23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Singh, *et al.* (US 6,650,422, hereinafter referred to as Singh) in view of Singh, *et al.* (US 6,561,706, hereinafter referred to as Singh '706) and Arita (US 6,905,949). It is respectfully requested that this rejection be withdrawn for at least the following reasons. Singh, Singh '706, and Arita, when taken alone or in combination, fail to disclose, teach, or suggest each and every element recited in the subject claims.

To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) ***must teach or suggest all the claim limitations***. See MPEP §706.02(j). The ***teaching or suggestion to make the claimed combination*** and the reasonable expectation of success ***must be found in the prior art and not based on the Applicant's disclosure***. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added).

The subject claims generally relate to a system capable of detecting and mitigating line-edge roughness (LER) in a semiconductor photoresist while maintaining specified critical dimensions (CD). More specifically, independent claim 1 (and similarly independent claims 10 and 17) recites *a monitoring component that monitors information associated with at least one critical dimension and line-edge roughness on a photoresist, a non-lithographic shrink component that facilitates selectively mitigating line-edge roughness on the photoresist, and a trim etch component that facilitates selectively*

satisfying the at least one critical dimension specification on the photoresist. Singh, Singh '706, and Arita, when taken alone or in combination, do not disclose, teach, or suggest such claimed aspects.

The system in Singh is generally capable of deriving information from a fabricated semiconductor in order to improve the fabrication process for subsequent semiconductors or features. (See col. 2, ll. 22-25). Thus, a photoresist is examined for defects in situ, and then measures are taken to ensure subsequent photoresists or features are cured of the defect. However, Singh fails to disclose, teach, or suggest *mitigating line-edge roughness on the photoresist; and a trim etch component that facilitates selectively satisfying the at least one critical dimension specification on the photoresist.*

Contrarily, the subject claims recite the monitoring, mitigating LER, and ensuring CD as operatively coupled to a single photoresist. Thus, after a photoresist is subjected to monitoring, LER is mitigated *on the photoresist*, and CD is satisfied *on the photoresist*. This is different from Singh, as the system disclosed therein models a photoresist or feature post-manufacture and modifies fabrication of subsequent resists or features based on the acquired monitoring information. LER, on the other hand, is a post-fabrication problem requiring corrective measures to a feature already created; thus, there is no way to effectively cure LER of subsequent features before or as the features are being created. LER of a given feature is curable by post-fabrication techniques such as reflow. Thus, the subject claims recite monitoring and mitigating the LER *on the photoresist*; this would have to occur after the feature (or the entire photoresist) is created. For at least this reason, Singh does not disclose or suggest such aspects, nor could it be combined with any reference to teach this aspect as it discloses curing subsequent features or photoresists and not those already fabricated.

Additionally, the Examiner asserts in the Final Office Action dated March 22, 2007, that Singh discloses selectively mitigating portions of an image field however, the cited section recites such functionality for "subsequently formed features." (See col. 9, ll. 60-67). Thus, as described *supra*, the corrective measure is taken before forming the subsequent features. The subject claims on the other hand recite mitigating LER on a photoresist. LER is a post-fabrication defect, and is thus cured post-fabrication for a given photoresist or feature. Corrective measures taken for subsequent features that

mitigate defects before creation, as suggested by Singh, cannot help mitigate LER. For at least this reason, Singh still fails to cure the aforementioned deficiency of *mitigating line-edge roughness on the photoresist*.

Additionally, applicants' claimed subject matter is concerned with LER mitigation regardless of which side of the semiconductor is affected. On the contrary, Singh aims to mitigate asymmetry between one side of a semiconductor and the other. As a result, the Singh system rotates the device and compares the information of both sides to ascertain inconsistencies to be cured in subsequent fabrications. For this reason, the data collected, compared, and utilized between the monitoring components of the two systems is completely different such that the Singh system may disregard LER on subsequent photoresists if it were consistent on both sides of the completely fabricated photoresist being analyzed.

Moreover, Singh '706 fails to cure the aforementioned deficiencies of Singh. Specifically, as asserted by the Examiner in the Final Office Action dated March 22, 2007, at page 3, Singh '706 controls *subsequent* processes based on collected data as well. As described, *supra*, the subject claims recite the operative coupling of monitoring, mitigating LER, and specifying CD as all occurring for the same photoresist. Therefore, Singh '706 fails to cure the aforementioned deficiencies of Singh. Arita also fails to cure such deficiencies as it only teaches some reflow techniques.

For at least the foregoing reasons, Singh, Singh '706, and Arita, when taken alone or in combination, fail to disclose, teach, or suggest each and every element as recited in independent claims 1, 10, and 17. More specifically, Singh '706 and Arita fail to make up for the deficiencies of Singh. Thus, rejection of these claims, as well as claims 3-8 and 18-23, which depend therefrom, should be withdrawn

II. Rejection of Claims 9 and 11-16 Under 35 U.S.C. §103(a)

Claims 9 and 11-16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Singh in view of Singh '706 and Arita, as applied to claims 1, 3-8, 10, and 17-23 above, and further in view of Kim (US 6,730,458). This rejection should be withdrawn for at least the following reasons. Kim fails to makeup for the aforementioned

deficiencies of Singh, Singh '706, and Arita with respect to independent claims 1 and 10, from which claims 9 and 11-16 depend. Accordingly, this rejection should be withdrawn.

CONCLUSION

The present application is believed to be in condition for allowance in view of the above comments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [AMDP981US].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number below.

Respectfully submitted,

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